Remarks/Arguments

Examiner Phuong Huynh is thanked for the thorough Office Action.

In the Claims

Claims 2, 3 and 6 are amended to add -- and using said goodness of fit value to: (1) control the processes used to form the device or (2) screen the devices. – for support see claim 7, step d.

Claim 25, step b is amended to provide proper antecedent basis. For support see support for the claim 25, step c amendments.

Claim 25, step c is amended to include a third test measurement at a third test condition. At least 3 points are need to calculate a goodness of fit test. For support see spec p. 15, L 21-27, p. 16, L 2-3.

Dependent claims 26 and 27 are also amended to include the third test measurement. For support see spec p. 15, L 21-27, p. 16, L 2-3.

New claim 28 is added. For support see claim 3.

New claim 29 is added. For support see claim 3, see spec. p. 12, L 18-20; p. 14, L 1-5; p. 14. L 9-11; p. 24, L 12.

New dependent claim 30 is added. For support see p. 15, L 21-27, p. 16, LL 2-3.

New dependent claim 31 is added. For support p. 15, L 21-27, p. 16, L 2-3.

No new matter is added.

35 USC 102 Rejections

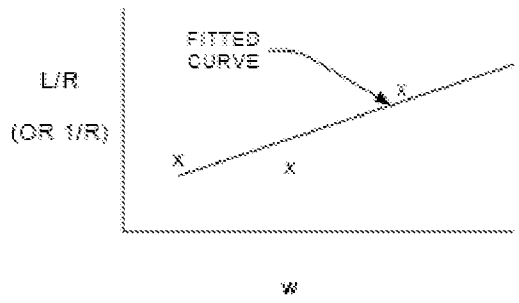
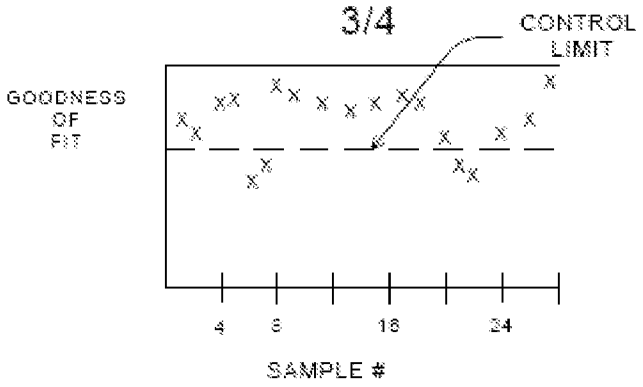
The rejection of claims 1-5 under 35 U.S.C. 102(b) as being anticipated by Rackoff et al. (hereinafter "Rackoff") (US Patent No. 5574890).

The rejection of claims 1-5 under 35 U.S.C. 102(b) as being anticipated by Rackoff et al. (hereinafter "Rackoff") (US Patent No. 5574890). is acknowledged. Reconsideration and withdrawal of the rejection is respectfully requested in view of the following remarks.

Claim 1 states:

1. (PREVIOUSLY PRESENTED) A test method comprising: a) obtaining test measurement values on a device at one or more independent variable values; b) calculating a goodness of fit value for a fitted curve between : (1) said test measurement values; and (2) the independent variable values; c) using said goodness of fit value to monitor the processes used to form said device.

Table 1	
1. (PREVIOUSLY PRESENTED) A test method comprising:	Nonliminting example
a) obtaining test measurement values on a device at one or more independent variable values;	

b) calculating a goodness of fit value for a fitted curve between : (1) said test measurement values; and (2) the independent variable values;	 FIGURE 3
c) using said goodness of fit value to monitor the processes used to form said device.	 FIGURE 4B

The instant office action on page 2 and 3

Regarding claim 1, Rackoff discloses a test method comprising:
a) obtaining test measurement values on a device at one or more independent variable values [see Rackoff: col. 10, lines 50-67; and col. 14, lines 21-30];
b) calculating a goodness of fit value for a fitted curve between:
(1) said test measurement values; and
(2) the independent variable values;
[see Rackoff: col. 14, lines 5-20 and lines 31-65]
c) using said goodness of fit value to monitor the processes used to form said device [see cot. 14, lines 11-20; and col. 16, lines 15-25].

Purpose of Rackoff and general overview

Rackoff is a method for Feed back tool control. A regression model is used to generate tool settings based on the incoming raw material characteristics (metal sheet). Based on the incoming raw material characteristics, the regression curve gives a arbor tool setting for the “slit” width. See abstract and summary of invention and claims. Rackoff uses a “goodness of fit” to characterize the “regression curve”

not to measure or monitor product. [see Rackoff: col. 14, lines 5-20 and lines 31-65] This is an important point.

In contrast to claim 1, Rackoff does not describe a process control method or a product screening method.

Table 2 below shows a comparison between claim 1 and Rackoff

Table 2	
Applicant's claim 1	Rackoff et al.
1. (PREVIOUSLY PRESENTED) A test method comprising:	Different – method to a data model to adjust an tool (arbor) setting – the set of values is entered into the program and the model tells the operator a setting for the tool (See summary of the intention)
a) obtaining test measurement values on a device at one or more independent variable values;	Different – Rackoff col. 10, L 50-67 and col. 14, l 21-30) Rackoff takes slit width measurement on many devices (e.g., metal strips) , not "a device".
b) calculating a goodness of fit value for a fitted curve between : (1) said test measurement values; and (2) the independent variable values;	Different - [see Rackoff: col. 14, lines 5-20 and lines 31-65] Rackoff is determines a regression model of variables for the arbor tool setting and "addition" (slit width) These measurement are taken on many different devices, not "a device"

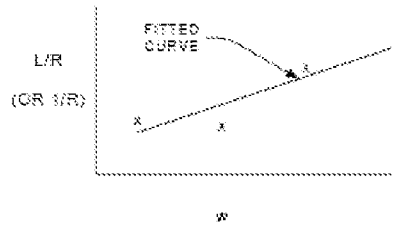


FIGURE 3

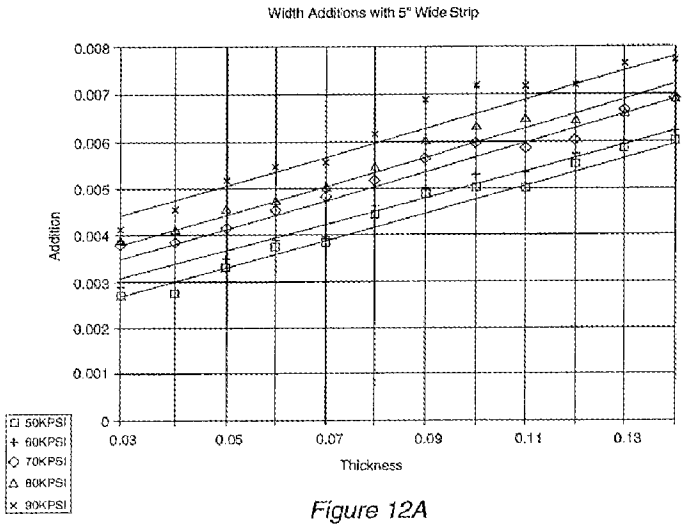


Figure 12A

c) using said goodness of fit value to monitor the processes used to form said device.

Figure 4B shows an example of how the "goodness of fit" values are used to monitor and control a process.

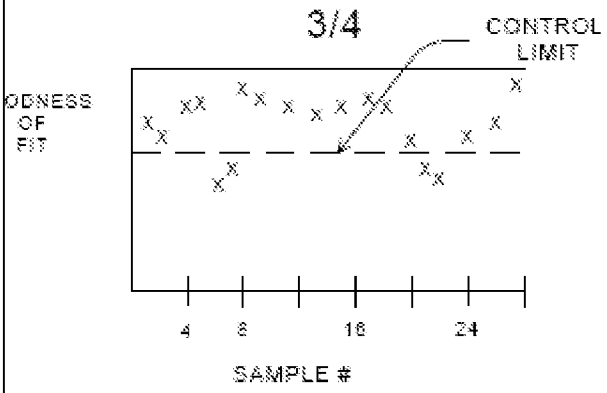


FIGURE 4B

DIFFERENT - **[see cot. 14, lines 11-20; and col. 16, lines 15-25]. – this section**

DIFFERENT - Rackoff merely updates the regression curve above figure 12A with newer data. See figure 13, see col 16. lines 15 to 24.

Rackoff does not use a "goodness of fit" test to monitor the process or for process control. Rackoff uses the regression curve for tool settings, not process control.

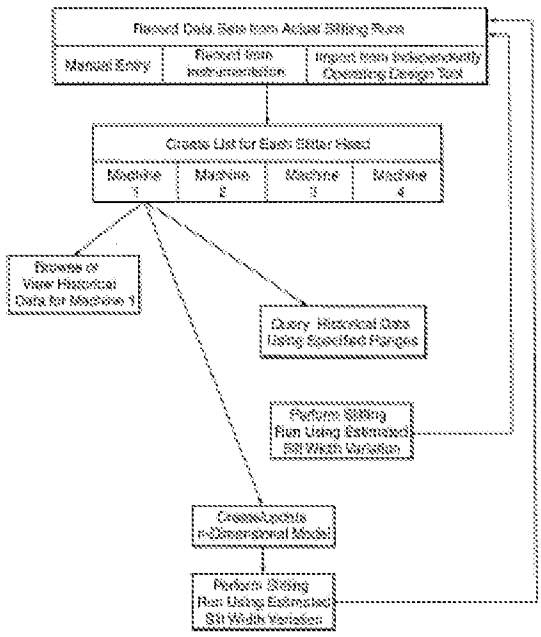


Figure 13

Claim 1 step c is not meet or suggested by Rackoff et al.

Step c states: "using said goodness of fit value to monitor the processes used to form said device."

An example of step 3 is shown in table 1 above. The "goodness of fit value "for the device is used to monitor the process.

Raskoff in contrast in [see col. 14, lines 11-20; and col. 16, lines 15-25] uses the Goodness of fit to characterize the regression curve used to determine the arbor tool setting.

Raskoff col 13, Lines 62- to col 14, line 20 states:

> In FIG. 12A, the adjustment (addition) to theoretical slit width required to account for slit width variation experienced (shrinkage in this case) is plotted as a function of material thickness for a number of material tensile strengths. In FIG. 12A, the theoretical slit width (slit width actually built) was maintained constant at a value of 5.0 inches. The lines drawn upon **FIG. 12A represent linear regressions of the data at each material tensile strength**. FIG. 12B illustrates a similar model wherein the theoretical slit

width was maintained at 13.0 inches.

In the slitting runs plotted/modeled in FIGS. 12A and 12B, the horizontal clearance was determined from the material thickness and the tensile strength as discussed above. There are, therefore, three independent variables represented in FIGS. 12A and 12B, material thickness, slit width and tensile strength.

Models 230 such as set forth in FIGS. 12A and 12B are preferably developed using data fitting methods such as **regression models** (for example, a linear regression or a least squares method) upon collection and storage of **sufficient data in list 25 to provide a statistically satisfactory correlation factor/"g**oodness of fit" between such a model and the actual data as known in the statistical art.

Models 230 are thereby produced to which reference can be made to estimate slit width variations to be experienced in future slitting runs.

(emphasis added by representative)

As stated above, Raskoff merely creates a linear regression model so the arbor operator can enter data and get a tool setting “e.g. the slit width variance” . See Roskoff col. 14, lines11 15.

The “goodness of fit” test (least squares test) is to ensure the data model acceptable fits the collected data. See See Roskoff col. 14, lines15 17. In contrast to applicant’s claim 1, step c), the “goodness of fit test” is not used to monitor the process.

Not that Raskoff figure 13 summaries the col. 16, L 15 to 25 section that the office action relies on to meet claim 1 step c. Note that Raskoff figure 13 does not show the claim 1, step c use of the goodness of fit values to monitor the process.

The office action appear to posit that using recent data to update the regression model meets claim 1 step c using a goodness of fit test to monitor the process. However, there is no support for this position in Rackoff. Rackoff only uses a goodness of fit test to check the regression model, not to monitor the process.

A further indication of the allowability of claim 1 is that claim 1's method could be implemented on Raskoff 's machine setting method to better monitor and control the Rashkoff devices (metal strips).

Claim 2 is non-obvious
Claim 2 states:

2. (CURRENTLY AMENDED) The method of claim 1 wherein step (c) further includes using control limits on the goodness of fit ~~values~~ value and using said goodness of fit value to: (1) control the processes used to form the device or (2) screen the devices.

The office action posits:

Regarding claim 2, Rackoff discloses wherein step (c) further includes using control limits on the goodness of fit values [see Rackoff: col. 14, lines 66-co1.15, lines 1-21].

Rackoff col 15,lines 15 -22 state:
Finally, upon development/storage of sufficient data within list 25 to provide a model 230 having a sufficient statistical correlation to actual data, as such sufficiency is determined by the user of design tool 1, n-dimensional model(s) 230 can be created. For example, the user may wish to achieve a correlation factor of at least 0.9 before using model 230 to estimate slit width variation. For example, the user may wish to achieve a correlation factor of at least 0.9 before using model 230 to estimate slit width variation.

Rackoff col. 15, lines 1-21 describes a method to use the "goodness of fit" tests to check to see if the regress model is good enough. Rackoff gives an example where a user may want a correction facet of 0.9 before using the regression model to estimate the tool setting (slit width variation). If the correction factor is less than 0.9 , then the user can adjust the regression model or get more data. **This is not used to monitor the process**. It is important to note that the users can change the regress coefficient by changing the regression curve/model. This is in contrast to application's claim 2 that uses control limits on the goodness of fit values to monitor the process.

Claim 3 is non-obvious

Claim 3 states:

> 3. (CURRENTLY AMENDED) The method of claim 1 wherein step (c) further includes using control limits on the goodness of fit ~~values~~ value; said control limits established based on a history of goodness of fit values or on device requirements; and using said goodness of fit value to: (1) control the processes used to form the device or (2) screen the devices.

Applicant's Figure 4A shows a non-limiting example of claim 3.

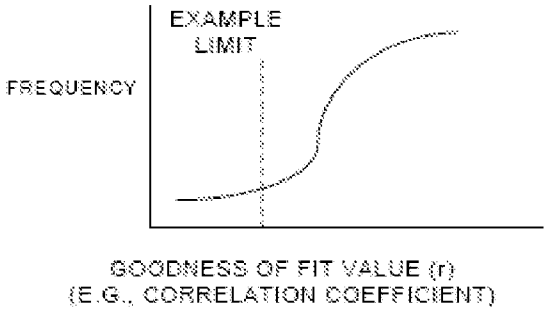


FIGURE 4A

The Office Action posits:

> Regarding claim 3, Rackoff discloses wherein step (c) further includes using control limits on the goodness of fit values; said control limits established based on a history of goodness of fit values or on device requirements [see Rackoff: Abstract; and col. 14, lines 66-co1.15, lines 1-91.

As discussed above in the claim 2 rejection, Rackoff uses goodness of fit to determine if the data regression model is acceptable, not if the process is acceptable.

Also, it is important to note that claim 3 control limits are on the "goodness of fit values" from a device. Not as Rackoff uses the "goodness of fit " on a regression curve model that is changed to change the "goodness of fit".

Claim 4 is non-obvious.

Claim 4 depends on non-obvious claim 1 is therefore non-obvious. As discussed above Rackoff least square fit only used in data model, in contact to claim 1 step c) monitor processes used to form the device.

Claim 5 is non-obvious

Claim 5 depends on non-obvious claim 1 is therefore non-obvious. As discussed above Rackoff least square fit only used in data model, in contact to claim 1 step c) monitor processes used to form the device.

Claim Rejections - 35 USC 103

Rejection of Claim 6 under 35 U.S.C. 103(a) as being unpatentable over Rackoff et al. (hereinafter "Rackoff") (US Patent No. 5574890') in view of Chang et al. (hereinafter "Chang") (US Patent 6,403,389).

The rejection of Claim 6 under 35 U.S.C. 103(a) as being unpatentable over Rackoff et al. (hereinafter "Rackoff") (US Patent No. 5574890') in view of Chang et al. (hereinafter "Chang") (US Patent 6,403,389) is acknowledged. Reconsideration and withdrawal of the rejection is respectfully requested in view of the remarks.

Claim 6 states:

> 6. (CURRENTLY AMENDED) The method of claim 1 wherein the test measurement values are resistance or capacitance measurements values; and step (c) further comprises and using said goodness of fit value to: (1) control the processes used to form the device or (2) screen the devices.

The Office Action posits:

Regarding claim 6, Rackoff does not disclose the test measurement values are resistance or capacitance measurement values.
Chang teaches the test measurement values are resistance or capacitance measurement values [see Chang: Abstract; col. 1, lines 16-20; and col. 4, lines 25-43].
It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Rackoff to include the test measurement values, as taught by Chang, to increase accurate electrical measurement of the conductor layer's sheet resistivity for use in an integrated circuit design to ensure manufacturability and performance [see Chang: Abstract; col. 1, lines 16-20; and col. 4, lines 25-43].

Combination of Rackoff and Chang is improper

Combination of Rackoff and Chang is improper. The combination is improper for at least the following reasons:

- unsuggested combination. – neither patent suggest combination.
- only by hindsight – can't combination unless trying to meet applicant's claims
- neither patent will work if combined. – the Rackoff data modeling is not applicable on the Chang's resist structure.
- the patent solve different unrelated problems and therefore no motivation to combine. Both problems are different than applicant's problem and solution.

Even if combined, claim 6 is non-obvious.

As stated above, claim 1 is non-obvious. Therefore claim 6 is non-obvious.

Amended claim 6 has novel elements as discussed above in the section on claims 2 and 3.

New claim 28 is non-obvious

Claim 28 states:

28. (NEW) The method of claim 1 wherein step (c) further includes using control limits on the goodness of fit value; said control limits established based on a history of goodness of fit values or on device requirements; and using said goodness of fit value to screen the devices.

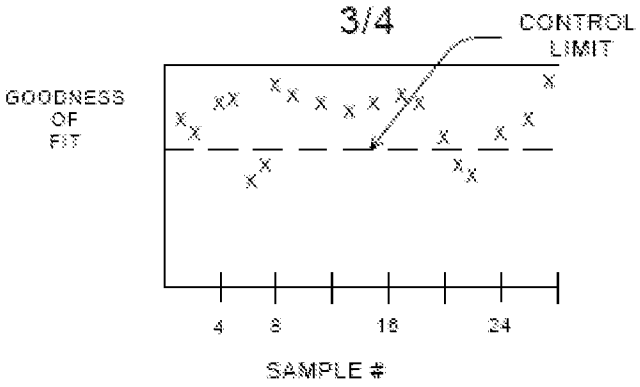


FIGURE 4B

Applicant's figure 4B above shows a non-limiting example of the method of claim 28.,

The cited reference do not suggest " using said goodness of fit value to screen the devices. " For example, Rackoff used the Measurement" (not the a "goodness of fit" of the measurements), to make a regression curve. **Rackoff does not screen the devices using the "goodness of fit".**

New claim 29 is non-obvious

Claim 29 states

29. (NEW) The method of claim 1 wherein step (c) further includes using control limits on the goodness of fit value; said control limits established based on a history of goodness of fit values or on device requirements; and using said goodness of fit value to detect low level defects in the devices.

The cited references do not suggest "using said goodness of fit value to detect low level defects in the devices. "

New Claims 30 and 31 are non-obvious

New claims 30 and 31 are not suggested by the cited references.

Allowable claims

The allowance of claims 7-27 is gratefully acknowledged.

All Pending Claims Addressed

It is believed that all the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper. and the amendment of any claim does not necessarily signify concession of the unpatentability of the claim prior to its amendment.

CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectfully requested. Allowance of all claims is requested. Issuance of the application is requested.

It is requested that the Examiner telephone the undersigned attorney at (215) 670-2455 should there be anyway that we could help to place this Application in condition for Allowance.

Charge to Deposit Account

The Commissioner is hereby authorized to apply any fees or credits in this case, which are not already covered by check or credit card, to Deposit Account No. 502018 referencing this attorney docket. The Commissioner is also authorized to charge any additional fee under 37 CFR §1.16 and 1.17 to this Deposit Account.
Respectfully submitted,

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